

# Algebra/Topology Seminar

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## FLIPPING NON-CROSSING SPANNING TREES

Thursday, September 19, 2024

3:00 p.m. in BB-B012

ABSTRACT. For a set  $P$  of  $n$  points in general position in the plane, the flip graph  $\mathcal{F}(P)$  has a vertex for each non-crossing spanning tree on  $P$  and an edge between any two spanning trees that can be transformed into each other by one edge flip, i.e., the deletion and addition of exactly one edge. For  $P$  in convex position, we study the diameter  $\text{diam}(\mathcal{F}(P))$  of this flip graph; that is, the number of flips needed to get from a tree to another in the worst case. Modulo an additive term of size  $o(n)$ , a lower bound of  $1.5n$  and an upper bound of  $2n$  from 1999 were not improved until  $\text{diam}(\mathcal{F}(P)) < 1.9512n$  was shown last year. We improve the lower bound to  $1.5\bar{n} - O(1) = \frac{14}{9}n - O(1)$  and the upper bound to  $1.6\bar{n} - 3 = \frac{15}{9}n - 3$ . The lower bound disproves the conjecture that  $\text{diam}(\mathcal{F}(P)) \leq 1.5n$  holds for all  $P$  in general position.

Joint work with Linda Kleist, Torsten Ueckerdt, and Birgit Vogtenhuber.